

# Search for New Physics in $l\gamma\cancel{E}_T b$ Events and $\sigma_{t\bar{t}\gamma}$ measurement

## Motivation

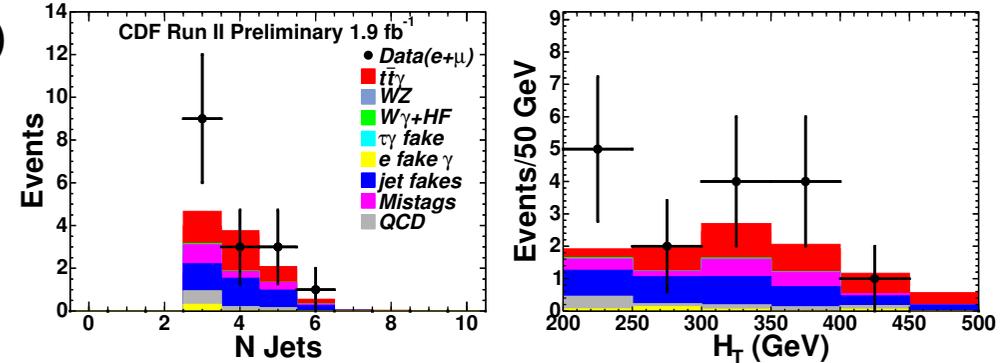
- Extension of  $l\gamma\cancel{E}_T$
- Signature with  $b$  and  $t$ ,  $W$  and  $\gamma$
- $t\bar{t}\gamma$ : control sample for  $t\bar{t}H$  (LHC), Q(top)

## Results

CDF Run II Preliminary, $1.9\text{fb}^{-1}$			
$l\gamma\cancel{E}_T b$	$e\gamma\cancel{E}_T b$	$\mu\gamma\cancel{E}_T b$	$(e + \mu)\gamma\cancel{E}_T b$
Expected	$16.8 \pm 2.2$	$11.1^{+1.7}_{-1.4}$	$27.9^{+3.6}_{-3.5}$
Observed	16	12	28

CDF Run II Preliminary,  $1.9\text{fb}^{-1}$

$t\bar{t}\gamma$	$t\bar{t}\gamma(e)$	$t\bar{t}\gamma(\mu)$	$t\bar{t}\gamma(e + \mu)$
Predicted	$6.7 \pm 1.4$ (tot)	$4.4^{+1.3}_{-0.8}$ (tot)	$11.1^{+2.3}_{-2.1}$ (tot)
Observed	8	8	16



The probability, assuming no true  $t\bar{t}\gamma$  Standard Model (SM) signal, for the background alone to produce at least as many events (16) as observed in data, is 1% ( $2.3\sigma$ ). Assuming SM  $t\bar{t}\gamma$  production, we calculate the  $t\bar{t}\gamma$  cross-section to be  $\sigma_{\text{semileptonic } t\bar{t}\gamma} = 0.15 \pm 0.08$  pb. SM prediction is  $\sigma_{\text{semileptonic } t\bar{t}\gamma}^{\text{SM}} = 0.080 \pm 0.011$  pb.

